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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/646,708	08/25/2003	Alfred Ecker	038741.52686US	9822

23911 7590 05/23/2007
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EXAMINER	
LEE, PATRICK J	
ART UNIT	**PAPER NUMBER**
2878	

MAIL DATE	DELIVERY MODE
05/23/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

T14

Office Action Summary	Application No.	Applicant(s)	
	10/646,708	ECKER ET AL.	
	Examiner	Art Unit	
	Patrick J. Lee	2878	

-- *The MAILING DATE of this communication appears on the cover sheet with the correspondence address* --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *11 May 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,5-12,15,17 and 19-28* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,5-12,15,17 and 19-28* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *20 February 2007* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. This action is in response to amendment filed May 11, 2007.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. Claims 1, 5-12, 15, 17, & 19-28 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter, which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. With respect to claims 1 & 12, there is no explicit statement that "no metallic material is included in the recess". The specification only discloses that an optical fiber can be bonded on the workpiece with an adhesive (see specification page 4, lines 25-29). This statement leaves open the possibility of metallic material to be within the recess. There appears to be no other recitation within the specification as to the composition of the adhesive. As a result, claims 1 & 12 and dependent claims 5-11, 15, 17, & 19-28 are rejected. For examination on the merits, the claims will be construed not to have the metallic material limitation.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

6. Claims 1, 5-7, 10-12, 15, 19-23, 25, & 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 5,525,796 to Haake in view of US 6,774,354 B2 to Ames.

With respect to claim 1, Haake discloses a fiber optic sensing apparatus comprising: fiber optic element (16) as an optical fiber assigned to a workpiece (12). Haake discloses the formation of groove (40) within the workpiece (12) in which fiber (16) is disposed. The size of groove (40) is such that fiber optic element (16) can adequately fit without extending outside the top surface of the workpiece (12). As a result, the groove has a depth and breadth that would match the diameter of the optical fiber. In the alternative, if a tighter fit between the groove and the fiber is required, to

modify the groove is known and taught by Ames, who discloses fibers (12) to be disposed in tight fitting grooves (15). To modify the grooves accordingly would have been obvious to one of ordinary skill in the art because the amount of material removed from the workpiece to make the groove would be reduced, thereby ensuring a higher degree of structural integrity of the workpiece. Haake also does not explicitly disclose the use of fiber optic Bragg grating sensors. However, the use of Bragg grating sensors is known in the art because Ames discloses Bragg gratings (18) to be disposed. To modify the fibers of Haake to include Bragg gratings (18) would have been obvious to one of ordinary skill in the art because the Bragg gratings would allow for determination of changes in the tension (see Ames column 3, lines 10-15 and column 3, lines 38-44).

With respect to claims 5-6, the modified Haake discloses the device as previously described. However, the modified Haake does not explicitly disclose the use of a second optical fiber in a different geometrical configuration and curvature. To modify the teachings of Haake accordingly is known in the art as a mere duplication of parts and would have been obvious to one of ordinary skill in the art because this arrangement would allow for determination of the strains over a greater area of the workpiece.

With respect to claim 7, the modified Haake disclose the fiber (16) to be disposed in a straight line (see Haake figure 2).

With respect to claims 10-11, the modified Haake disclose the workpiece as a wing, which would constitute a dynamically loaded component.

With respect to claim 12, Haake discloses a fiber optic sensing apparatus comprising: fiber optic element (16) as an optical fiber assigned to a workpiece (12). Haake discloses the formation of groove (40) within the workpiece (12) in which fiber (16) is disposed. The size of groove (40) is such that fiber optic element (16) can adequately fit without extending outside the top surface of the workpiece (12). As a result, the groove has a depth and breadth that would match the diameter of the optical fiber. In the alternative, if a tighter fit between the groove and the fiber is required, to modify the groove is known and taught by Ames, who discloses fibers (12) to be disposed in tight fitting grooves (15). To modify the grooves accordingly would have been obvious to one of ordinary skill in the art because the amount of material removed from the workpiece to make the groove would be reduced, thereby ensuring a higher degree of structural integrity of the workpiece. Haake also does not explicitly disclose the use of fiber optic Bragg grating sensors. However, the use of Bragg grating sensors is known in the art because Ames discloses Bragg gratings (18) to be disposed. To modify the fibers of Haake to include Bragg gratings (18) would have been obvious to one of ordinary skill in the art because the Bragg gratings would allow for determination of changes in the tension (see Ames column 3, lines 10-15 and column 3, lines 38-44).

With respect to claims 15 & 19, the modified Haake discloses the device as previously described. However, the modified Haake does not explicitly disclose the use of a second optical fiber in a different geometrical configuration and curvature. To modify the teachings of Haake accordingly is known in the art as a mere duplication of parts and would have been obvious to one of ordinary skill in the art because this

arrangement would allow for determination of the strains over a greater area of the workpiece.

With respect to claims 20-21, the modified Haake discloses the device as previously described. The modified Haake does not explicitly disclose the device to be disposed on a turbine blade, but the use of the fiber optic sensing devices on turbine blades is known in the art as an intended use of the device and would have been obvious to one of ordinary skill in the art because airplane wings and turbine blades both experience high stress/strain and high temperature conditions.

With respect to claim 22, the modified Haake discloses the device as previously described. The modified Haake does not explicitly disclose the use of an electronic evaluation system, but electronic evaluation systems are well known in the art to be mere processors for the light signals detected from the Bragg grating sensors. To modify the teachings of Haake accordingly would have been obvious to one of ordinary skill in the art because the evaluation system would ensure for readings of the conditions to be available to a user.

With respect to claim 23, the modified Haake discloses the device as previously described. However, the modified Haake does not explicitly disclose the use of a polyimide-coated glass fiber. The use of polyimide-coated glass fibers is known in the art and would have been obvious to one of ordinary skill in the art because they provide for a relatively low cost fiber with the structural integrity required to last the conditions faced by the workpiece.

With respect to claim 25, the modified Haake discloses the device as previously described. The modified Haake does not explicitly disclose the device to be disposed on a turbine blade, but the use of the fiber optic sensing devices on turbine blades is known in the art as an intended use of the device and would have been obvious to one of ordinary skill in the art because airplane wings and turbine blades both experience high stress/strain and high temperature conditions.

With respect to claim 27, the modified Haake discloses the device as previously described. However, the modified Haake does not explicitly disclose the use of a polyimide-coated glass fiber. The use of polyimide-coated glass fibers is known in the art and would have been obvious to one of ordinary skill in the art because they provide for a relatively low cost fiber with the structural integrity required to last the conditions faced by the workpiece.

7. Claims 8, 24, 26, & 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 5,525,796 to Haake in view of US 6,774,354 B2 to Ames and in further view of US 6,600,149 B2 to Schulz et al

Haake and Ames disclose the device as previously described.

With respect to claim 8, the modified Haake does not explicitly disclose the arrangement of the Bragg grating sensor arranged in an angular straight line in such a way that the first section of the fiber is angled off from a second section. However, this arrangement is known in the art as Schulz et al disclose in a related optical grating device for determining strain on the workpiece where fiber sensors are embedded on a wing (see figure 17). To modify the teachings of Haake accordingly would have been

obvious to one of ordinary skill in the art because this would allow the fibers to cover as much of the wing as possible and make it possible to dispose the light emitter/detector module as close to each other as possible.

With respect to claim 24, the modified Haake discloses the grating sensors to be used in determining strain (see Schulz et al abstract).

With respect to claim 26, the modified Haake discloses the grating sensors to be used in determining strain (see Schulz et al abstract).

With respect to claim 28, the modified Haake discloses the grating sensors to be used in determining strain (see Schulz et al abstract).

Response to Arguments

8. Applicant's arguments with respect to claims 1, 5-12, 15, 17, & 19-28 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Patrick J. Lee whose telephone number is (571) 272-2440. The examiner can normally be reached on Monday through Friday, 8:00 am to 5:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Georgia Epps can be reached on (571) 272-2328. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Patrick J. Lee
Examiner
Art Unit 2878

PJL
May 18, 2007